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ABSTRACT

Although the importance of systematic evaluation of educational policy and practice is well established, various problems confound the intention of evaluating regional or national activity with regard to computer-related activities in education. At least two of these problems relate to a general conception of the appropriate entry points for evaluative activity, while at least two other problems relate specifically to computer-related policy and practice. At least one additional layer of difficulty applies when the evaluation of such activity involves an external evaluator working internationally, particularly in the less developed countries. Each of these classes of impediments is briefly analyzed and a general model for evaluating regional and national-level computer-related educational activity is discussed with respect to the classes of impediments and illustrated in the context of an ongoing external evaluation of a national educational software development project in the Netherlands. This activity--titled the "POCO Project" after its Dutch name meaning software development for computers in education--has the organizational goal of developing a first set of 18 software packages in 18 months. It focuses on developing educational software that can be used by teachers in a meaningful way during their regular teaching activities and with such frequency as to strengthen the teachers' perceptions that using such packages is an effective and efficient response to an educational need. The particular advantages of an outside evaluator are emphasized in this description of the POCO Project. (Author/SLD)

Problems and Perspectives on the Evaluation of Regional and National Computer-Related Educational Activity

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ABSTRACT

Although the importance of systematic evaluation of educational policy and practice is well established, various problems confound the intention of evaluating regional or national activity with regard to computer-related activities in education. At least two of these problems relate to a general conception of appropriate entry points for evaluative activity while at least two other problems relate specifically to computer-related policy and practice. At least one additional layer of difficulty applies when the evaluation of such activity involves an external evaluator working internationally, particularly in less developed countries. Each of these classes of impediments is briefly analyzed; also, a general model for evaluating regional and national-level computer-related educational activity is discussed with respect to the classes of impediments and illustrated in the context of an ongoing external evaluation of a national educational software development project in The Netherlands.

Problems and Perspectives on the Evaluation of Regional and National Computer-Related Educational Activity

Problems Associated with the Evaluation of Regional or National Computer-Related Educational Activity

Very often, decision makers, involved with computer-related policy or practice, especially at the regional or national level, express the conviction that it is "too early" to evaluate these sorts of activities. This perspective suggests the decision makers have an unproductively narrow view of evaluative activity, focussing on it as a summative, endpoint activity. Such a conception overlooks the considerable value evaluation can bring to the formative stages of activity. The evaluation models developed by Stake (see, for example, 1973) clearly support the place of logical, analytic assessment of the assumptions and intentions of any educational activity, and yet this aspect of evaluation appears to be undervalued in the field. Accompanying the perspective that it is too early to evaluate computer-related educational activity is the view that an evaluation will somehow deflate the momentum accompanying exploratory activity in this area. Again, this type of opinion reflects a narrow view of evaluation, in this case as a perjorative, judgemental exercise rather than as a constructive, collaborative procedure.

Another general problem impeding the assignment of evaluative activity to computer-related policy and practice is the perceived lack of a practical and cost-effective methodology for conducting such an evaluation. Evaluation activity is often seen as expensive and cumbersome, and

frequently is of little applicability when long time delays separate it from its usefulness in the field.

This last point is particularly critical with respect to computer-related activity. Such activity is changing and evolving so rapidly that indeed it can be seen as a "moving target" with respect to evaluation. Unless evaluation can be brought to bear quickly in a situation, its prescriptions are likely to be outdated before they are distributed.

At least one other characteristic of computer-related activity distinguishes it from most other evaluation focuses: computer-related activity is frequently "belief driven" rather than goal driven (Baker, 1988). Baker notes that general policy for computer use in schools is often unrelated to specific student achievement goals, but instead is "motivated by a more general desire to improve educational quality, impelled by a set of beliefs that the technology will somehow affect the quality of the student's learning" (p. 2). In developing countries, these beliefs may be driven more by the desire to not fall further behind, relative to more developed countries, than by a proactive plan for particular computer-related strategies.

With these, and other conceptual and practical difficulties, it is not surprising that evaluation activity is far less prevalent than implementation activity with respect to computer-related technology in schools. What could be helpful is more awareness of an evaluation strategy that is simple and flexible enough to be used at any entry point with respect to computer-related policy and practice but still powerful enough to supply timely and relevant feedback to central decision makers.

A General Model for the Evaluation of Computer-Related Educational Activities

A very simple model, based on Stake's 1973 concepts of congruency and contingency assessment, has served as the framework for a series of evaluation projects involving regionwide or nationwide computer activity. The model is shown in Figure 1. The major features of the model relate to the possibility for evaluation of the logical relationships among assumptions about the educational situation, intended goals, and intended means (represented by the arrows between Boxes A and B, A and C, and B and C); the congruence between observed and intended procedures (represented by the arrows between Boxes C and D); and the interpretation of outcomes (as represented by the four arrows radiating from Box E). This distinction allows the discrimination of 'theory breakdown' and 'performance breakdown' (Suchman, 1976). The constructive use of the model occurs through its iterative application; intentions of the system -- with regard to basic assumptions, or goals, or operational strategies -- can be reexamined and altered at any time, triggering a new cycle of assessment of logical relationships and/or congruences between intended and actualized activity. In this process, assumptions can be clarified and goals become better articulated, an outcome that Baker sees as a major contribution of evaluation of belief-driven computer-related activities.

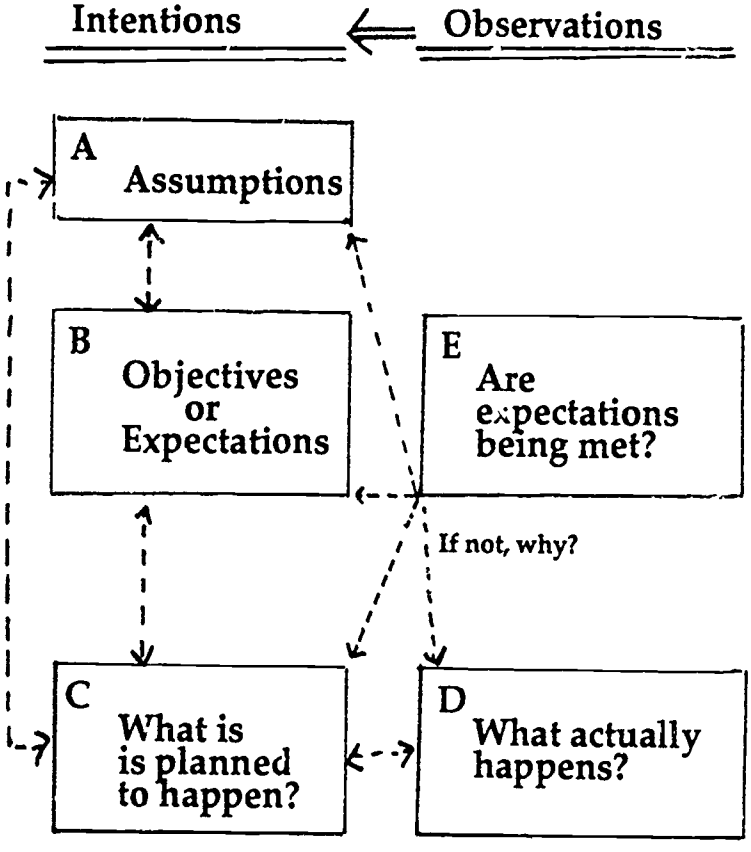

Figure 1. A simple general model for educational evaluation, adapted from Stake (1973).

The Model Applied to a National Computer-Related Educational Project

The model has been used as the basis for an ongoing, external evaluation of a national computer-related project in The Netherlands. This activity, called the "POCO Project" from its Dutch name "Programmatuur Ontwikkeling voor Computers in het Onderwijs" (software development for computers in education) was established by the Ministry of Education in The Netherlands

in June 1987. The project has as its goal the development of educational software

> that can be used by teachers in a meaningful way during their regular teaching activities, and that can be used with such frequency as to strengthen the teachers' perceptions that using such packages is an effective and efficient response to an educational need. (Policy Note, Minister of Education, June 11, 1987, p. 2).

The project was also given the organizational goal of completing a first set of 18 software packages in 18 months ("cycle 1") and a subsequent set of approximately 25 more packages during the following two years (cycle 2). For political reasons, the Minister also established that the Project must involve collaboration with the established educational publishers in The Netherlands (to minimize their fears that a subsidized government project would complete with their own commercial initiatives).

A final goal for the project emerged during the initial elaboration of the Minister's directive:

> The POCO Project has to promote products that are marketable, both to the internal Dutch market but also in foreign countries. Through the incomes of these "salable" products (both the software and the approach used for developing the software) the project can become a self-supporting activity (Moonen, 1987, p. 3).

A critical point for the project was to be the transition between Cycle 1 and 2. At that point, a decision about continuation of the project under its current management would be made by the Ministry. With approximately $ 12 million U.S. committed to the overall project, the seriousness of preparation for the post-Cycle 1 evaluation can be appreciated. Consequently, the director of the group given the contract for the project felt it desirable to involve an external evaluator throughout the Cycle 1 period. The combination of external evaluation and ongoing evaluation reflected two sets of needs: to provide an informed critical commentary on project activities from the perspective of someone from both outside the project and outside the Dutch educational community, and to interprete those activities relative to the short-term and long-term goals of the project.

A plan for the evaluation was developed by an external evaluator who would make periodic visits to the project over its first 18 months, and present, at specified intervals, eight evaluation reports (Collis & Berger, 1987). An interesting component of the evaluation from a practical dimension was that the evaluator maintained a regular data collection stream through electronic "interviewing" via telecommunications during the times she was not visiting the project.

An immediate challenge of the evaluation was how to access progress toward goals that could only be directly assessed long after the project was completed -- goals about developing software that will be "in frequent use" by teachers and that will be profitable in the educational market outside The Netherlands. The development of feedback loops (or "confrontation" opportunities) between representatives of those eventual target groups -- teachers from The Netherlands and educational decision makers from outside The Netherlands -- was seen as a means by which the

project could anticipate the long-range response from these groups (Moonen, 198?). Having frequent "confrontations" would also allow adjustments to be made to the packages during the design and development phase in order to further enhance their eventual market appeal. In consequence a major focus of the ongoing external evaluation of the project was the degree to which these sorts of confrontations took place (Collis & Bergers, 1987).

A second major focus of the evaluation involved the interpretation of project slowdowns. In a project of the scope and complexity of POCO, involving, in various ways, hundreds of people in diverse groups (educational publishers, teachers, curriculum specialists, educational technologists, commercial software houses) working on, in effect, 18 different projects, it is inevitable that project execution would not always proceed as planned. However, it was perceived to be highly valuable both in an immediate sense in Cycle 1 and for planning relative to Cycle 2, that a distinction be made between slowdowns rooted in "theory" or "logical" problems and slowdowns rooted in implementation specifics. When execution decisions form the major basis of project slowdowns, the evaluator could offer comments on alternative execution strategies. Relative to theory or logical slowdowns, however, the evaluator could also help the management team identify elements of their basic planning which might be modified in Cycle 2. Also, the evaluator could elaborate more globally on basic implications of the original assumptions and goals of the project.

For example, a fundamental tension exists between the goal of actively involving educational publishers in the project and the goal of creating products of interest to buyers outside The Netherlands. Involving publishers meant creating products that reflected existing Dutch texts and methodology, thus limiting the portability and innovativeness of the

software. It would be inappropriate to eventually indict the POCO management for not meeting the dual goals of publisher accommodation and external saleability when this result is more a logical consequence of initial assumptions about the project then is is something that could be related to project management execution decisions. Thus, the continual application of the model shown in Figure 1 allowed the evaluator to categorize interpretations of ongoing project activity and to offer constructive suggestions based on those interpretations (Collis & Moonen, 1988).

Because the POCO evaluation was ongoing its interim reports could focus on this distinction between "theory" and "execution" relative to specific aspects of the project at the times they were most pertinent to the project. Some of the evaluation focuses included:

- Organization of appropriate staff
- Development of a priority list of software topics
- Development of product descriptions
- Lines of communication and responsibility within the project
- Interactions with publishers
- Technical development of the software
- Development of print materials to support the software
- Field testing of products
- Ongoing field involvement ("confrontations")
- Ongoing information dissemination about the project, nationally and internationally

The evaluation had at least one other contribution. The periodic reappearance of the evaluator with the mandate to ask individuals about

their intentions and activities served as a catalyst to better project self-awareness. This is a particular contribution of an external evaluator -- to be sufficiently outside the system that it does not seem unnatural at various points in time to ask specific questions about execution decisions and intentions in the way it would if the evaluator were part of project staff. The stimulus of the evalutor's visits ensured the project had regular periods of self-inventorization, something it would probably not have taken time to do, at least on such a regular basis, without such a stimulus.

Although Cycle 1 has been given an extension beyond its original 18-month timeline (slowdowns were much more extensive than anticipated), the ministerial evaluation relative to Cycle 2 has been recently completed and the POCO management have been given approval to proceed with Cycle 2. The extensive documentation provided by the external evaluator in the eight Cycyle 1 evaluation reports is now serving as a contribution to planning revisions for Cycle 2.

Implications for Developing Countries

This evaluation project in itself is only of interest if the experiences from it can be transferred and applied to the evaluation of other computer-related initiatives. A particular value would be the transfer of the approach to computer-related projects in less developed countries. Constraints of resources as well as exploratory rather than objectives-driven activities will characterize many of these initiatives; yet the contribution of an evaluation is particularly important when severely limited resources cannot afford to be wasted.

Based on experience with using the model in The Netherlands as well as in other large-focus evaluators, it appears reasonable to advocate the use of the model in other national situations involving computer activity in education. The problems that are typically associated with such evaluations can be handled within the model. The perception of evaluation as being "too early" relative to the maturation level of such activity is not pertinent with the model. Even activity that is only in its initial stages can be considered relative to the logical associations between its assumptions, goals, and currently planned strategies. Contrary to being seen as a judgmental, summative activity, the model encourages a conceptuatization of evaluation as a constructive, interative process valuable to activity interpretation and modification even as the activity is developing. The timely infusion of this sort of interpretive comment is especially helpful to exploratory technology-related projects where both environment and personnel characteristics can change rapidly during the implementation of an activity. The contribution of this approach to evaluation to the process of goal formation is also strong. The gradual maturation of computer-related activity from a "belief driven" to a "goal driven" process will only occur with periodic assessments of what is being learned about the beliefs as well as what is really meant by the beliefs. The model emphasizes these reconsiderations of assumptions and expectations.

A final comment must be made about the aspect of having an external evaluator stimulate this sort of appraisal. The particular contributions of an evaluator from outside the system are that he or she can often better identify assumptions and distinguish between assumption-related consequences and implementation-related consequences than can individuals within the system who are often involved in both the assumptions and their execution. Also, with respect to computer-related activity in education,

the rapid escalation of experiences in other countries can be helpfully applied to the interpretation of local experiences; a broadly based external evalator can bring this contribution. There are, of course, difficulties in working with an external evaluator, chief among them being language and cultural differences. The external evaluator must also be able to rapidly appraise the political realities of the situation as well as identify the significant decision making chain. For these reasons it is helpful if the external evaluator can be teamed with an internal person. The internal person must be knowledgeable and bilingual but should not be directly part of the computer-related system him or herself. Given this sort of support, the approach diagrammed in Figure 1 can be particularly receommended for countries with more limited resources, in that this gives them heightened incentive to accumulate the best insights possible about the realistic possibilities of utilization of computer-related technology in their educational systems.

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